

5.50 A YEAR

THE WEEKLY SUMMARY OF CURRENT SCIENCE

A SCIENCE SERVICE PUBLICATION

ROCKETS AND MISSILES

USSR Leads in Fuel Control

RUSSIA HAS BEEN able to lead in rocketry because of advanced control over fuels, Dr. Roger R. Revelle, director of the Scripps Institution of Oceanography and a divisional committee chairman of the National Science Foundation, said at the National Science Foundation hearings before a subcommittee of the House Committee on Appropriations. Part of the hearings has been released and part is still classified.

Dr. Revelle said:

"In space research, we are familiar with the fact that the Russians have rocket engines with three or four times the thrust of any of ours. This is not due simply to a massive effort, but to a systematic development.

"The Russians started with small rockets and worked up stepwise, very thoroughly, to big ones.

"Apparently their ability to produce engines of such large thrust depends upon a very thorough knowledge of the performance of the rocket fuels, both the liquid and the solid.

"They evidently have much more control over their fuels than we have over ours, and can predict their performance better."

Rep. Harold C. Ostertag (R., N.Y.) asked, "What do you mean by 'control over the fuel'?"

Dr. Revelle: "Knowing how the fuel is going to perform and what its variability is. They seem to know it better than our people do. This is based, obviously, on a broad program of experimentation."

Then Rep. Albert Thomas (D-Tex.), chairman of the Subcommittee on Independent Offices, said:

"May I ask you a question along this line? I have known the Chief of the German Naval Operations Division for ten years. He is certainly a student. . . ."

The rest of the fuel control testimony before the subcommittee was off the record.

On May 15, the USSR demonstrated its fuel control with another spectacular launch, that of a five-ton satellite designed to carry a man, but carrying a dummy—this time.

Science News Letter, June 4, 1960

RADIO

Trans-Ocean Radio Waves

A METHOD for radio communication across the ocean using a naturally available layer of air will be tested soon, five scientists of the National Bureau of Standards report in Washington, D. C.

They propose using the trade-wind "inversion" over the South Atlantic as a channel for radio messages at a frequency of 200 megacycles, which is in the very high frequency range.

The scientists who investigated the trade-wind inversion for radio use are Drs. M. Katzin, H. Pezzner, B. Y.-C. Koo, J. V. Larson and J. C. Katzin of Standards' Central Radio Propagation Laboratory at Boulder, Colo.

Their investigations followed observations during World War II that radar sets at Bombay, India, often showed the entire coast of Arabia, and frequently ranges of up to 1,700 miles were obtained. A radar range of 1,700 miles means the radar waves actually traveled up to 3,400 miles.

Because weather conditions over the South Atlantic are similar to those that produced the record radar scans over the Arabian Sea, the scientists investigated conditions over the South Atlantic to determine if an atmospheric layer there could be used for radio communications. They found that a duct is present most, if not all, of the time.

Two airplanes, one on each side of the South Atlantic, could be used to send and receive radio messages through this duct. The channel is about 1,000 feet thick. It varies from a height of 4,300 feet above the earth's surface in summer to some 6,000 feet in the winter.

The scientists believe that radio messages

could be sent through the duct with relatively little power. In the Journal of Research of the National Bureau of Standards, 64D:247, 1960, they suggest using two airplanes to test this new method.

Science News Letter, June 4, 1960

ROCKETS AND MISSILES

Sputnik IV Satellite Passes Over Detroit

See Front Cover

THE RUSSIAN SATELLITE Sputnik IV passing over Detroit, Mich., on May 18, is shown on the cover of this week's SCIENCE NEWS LETTER. The solid line is the satellite's trace; the dotted line is interpreted as the tumbling satellite casing. The photograph, taken during a 15-second interval, was recorded on the screen of a television satellite tracker developed by Bendix Aviation Corp., Southfield, Mich., for the Defense Department. The black line in the center is an element of the TV screen. The larger ball-like objects are stars of the constellation Cassiopeia. The smaller ones are stars invisible without optical aid.

Science News Letter, June 4, 1960

ROCKETS AND MISSILES

Tiros Spins at Same Rate, Not Slower, as Expected

THE WEATHER SATELLITE Tiros I is still spinning rapidly as it orbits about the world even though experts had expected it to slow down.

When the satellite was launched April 1,

the National Aeronautics and Space Administration announced that the satellite would remain stable as long as it maintained a minimum spin rate of nine revolutions per minute.

NASA said that when the spin slowed to nine rpm, three pairs of jets around the satellite's baseplate would send it rotating at 12 rpm again. Each set of jets could be used only once and would be set off by a command from the ground.

NASA said the spin-up was expected to be necessary about every 20 days.

But twice that time has elapsed and, according to a NASA official, the spin has not been noted to decrease—a simple infrared detector in the satellite helps keep tabs on the spin rate.

So far the jet system has not been needed. NASA officials now say they cannot say when or if the jet system will ever be needed.

Science News Letter, June 4, 1960

ROCKETS AND MISSILES

Launched Midas May Be First of Warning System

THE UNITED STATES launched an experimental satellite weighing two and a half tons into orbit May 24 to test the feasibility of using satellites to warn against missile attack.

Called Midas II, the satellite was boosted into orbit by an Atlas-Agena rocket. Inside the satellite is an infrared scanning device for spotting the heat generated by military bases, cities, rocket exhausts and the like. Future networks of Midas-type satellites may do what airplanes with conventional cameras could never do.

The satellites will be too high to be destroyed by any methods now known to be operational. (Midas orbits about 300 miles above the earth.)

And the satellites' infrared detectors will see through conventional camouflage. The detectors respond to heat from factories, cities, military bases, trains and the like.

This heat would seem to be impossible to camouflage. But an enemy might "confuse" an infrared satellite by setting up extra heat sources that have heat patterns like prime targets but are just decoys.

There are indications that the detectors may soon be developed to a point where they can distinguish one missile from another. They could do this by distinguishing between the varying heat patterns produced by the exhausts of different missiles.

The new satellite was similar to the Midas that failed Feb. 26.

The Midas network is one of two reconnaissance systems being prepared by the United States. The other, Samos, is designed to photograph enemy activities and bases.

There are indications that models of both Midas and Samos will be flying over the USSR by the end of this year. The experimental Midas, however, does not cross Russia.

The Midas system would radio missile data to ground stations to provide a 30-minute warning to the U. S. of a missile attack. (See photograph opposite page.)

Science News Letter, June 4, 1960

GENERAL SCIENCE

Condemns Secrecy Policy

Secrecy around military and atomic matters results in misinformation, half-truths and distortion of facts, a Nobelist charged. Most scientists look toward an "open" world.

GOVERNMENT MILITARY and atomic secrecy has been denounced. Dr. I. I. Rabi, Nobelist of Columbia University, indicated that secrecy was hampering negotiations to suspend nuclear bomb tests.

He said the secrecy surrounding the conduct of military and atomic matters results in a barrage of misinformation, half-truths and "outright distortion" of facts as the basis for public opinion. He spoke at the presentation ceremony of the Atoms for Peace Awards at the National Academy of Sciences in Washington, D. C. Dr. Rabi is a member of President Eisenhower's Science Advisory Committee.

Although Dr. Rabi did not mention any names, his attack on secrecy in Government, particularly in the atomic field, was aimed at the minority of scientists who believe only the threat of mutual mass annihilation and a complete arsenal of nuclear weapons can prevent global war. One of the most vocal members of this group is Dr. Edward Teller of the University of California, who is sometimes called the

"father" of the hydrogen bomb.

Most scientists in the United States and allied countries, Dr. Rabi said, look toward a "more open world" where the shadow of destructive warfare will hang less heavily over mankind. They believe the future should hold some vision more pleasant than "a huge super nuclear explosion."

Neither the scientists alone, nor officials who have much power by election or appointment but little or no knowledge of science and technology, can solve the problems of living peacefully in an atomic world. Even a combination of the best brains from the fields of science, business, religion, and academic and political life, Dr. Rabi said, would be hardly equal to the "task of mapping a wise and safe course through the tangle of mistrust and terror" that has grown up in the postwar years.

One cause of present problems is the distortion caused by exaggerated secrecy, with its consequent lack of informed public opinion, Dr. Rabi charged. This secrecy has actually gained very little for the U. S.

The Russians are not far behind us in atomic weapons, while our allies are way behind after spending much money rediscovering facts and methods already known in both the U. S. and the USSR.

Although most policy makers, amateur or professional, are not deeply interested in or capable of judging the technological situation, Dr. Rabi said, secrecy results in frustration, doubt and timidity about the exercise of independent judgment. The result is that many judicious persons accept judgments by others whose knowledge is often even more limited than theirs but which extends into the "dread domain of the top secret."

To live at peace with the atom, Dr. Rabi concluded, the U. S. must find its way back to the fundamental principles on which it was founded.

"We must again become a nation of free men informed by a free press."

Science News Letter, June 4, 1960

PHYSICS

Four Scientists Given Atoms for Peace Awards

FOUR OUTSTANDING scientists in the field of nuclear reactions were awarded the Atoms for Peace Awards at the National Academy of Sciences in Washington, D. C.

Two of them, Drs. Leo Szilard of the University of Chicago and Eugene P. Wigner of Princeton University, were instrumental in having the famous letter of Albert Einstein sent to President Franklin D. Roosevelt—the one that finally resulted in Government support for studies of nuclear reactions.

Another recipient, Dr. Walter H. Zinn, now vice-president of Combustion Engineering, Inc., worked with Dr. Szilard in observing the neutrons released when uranium fissions. This observation demonstrated the possibility of a chain reaction.

Dr. Alvin M. Weinberg, director of the Atomic Energy Commission's Oak Ridge National Laboratory, won the award for his sustained contributions to nuclear reactor development.

The Atoms for Peace Awards are a memorial to Henry and Edsel Ford. Recipients this year will share a total grant of \$150,000.

Science News Letter, June 4, 1960

PHARMACOLOGY

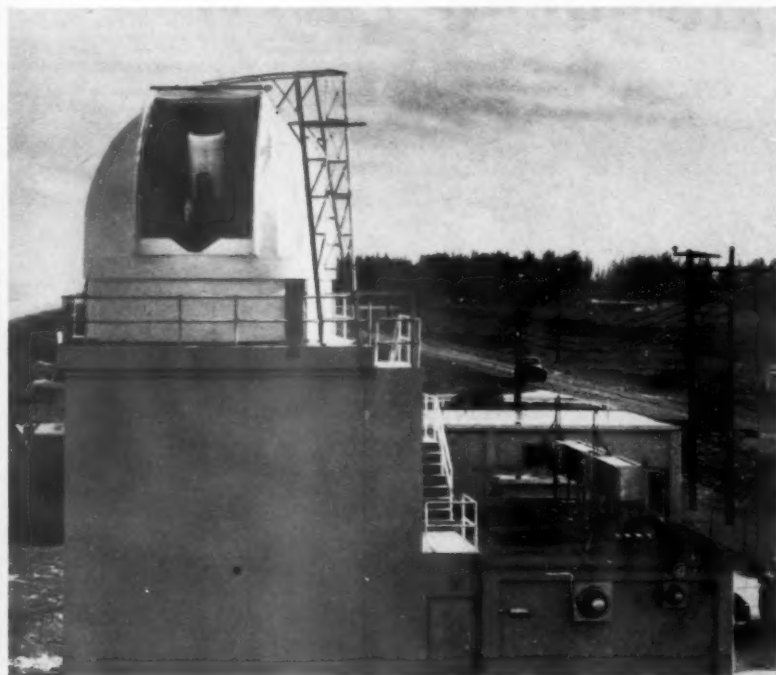
New Drug Controls Body Cholesterol

A NEW DRUG, claimed to reduce high level blood cholesterol in eight out of ten patients, has been released to physicians for prescription use.

Availability of the drug, triparanol (brand name MER/29), was announced at the American College of Cardiology meeting in Indianapolis, Ind., by the Wm. S. Merrell Company of Cincinnati, Ohio.

The drug is a capsule to be taken before breakfast. It has been clinically tested and reported free from bad side effects when taken in recommended dosages.

Science News Letter, June 4, 1960



INFRARED SCANNER—Infrared spectrometric studies of missiles fired from Cape Canaveral, Fla., are being made with an infrared rapid scan instrument. It was built by Perkin-Elmer Corp., Norwalk, Conn., and is located at Melbourne, Fla. The infrared measurement program, conducted under an Air Force contract, includes the nature and rates at which time reactions occur during powered flight. (See story opposite page.)

ASTRONOMY

Solving of Sun's Riddles

FUTURE SPACE PROBES may skim as "close" as two million miles from the sun's visible surface, a report to the National Academy of Sciences suggests.

Before this can be done, however, greatly improved materials must be developed since temperatures at that distance would be about 5,000 degrees Fahrenheit, roughly the melting point of the toughest materials now known.

A near-sun space probe is one of the several kinds of solar studies from high-flying balloons, satellites and probes recommended by the Academy's Space Science Board. The suggested experiments could yield answers to most of the still unsolved problems of the sun and its mighty outpouring of radiation.

Board members urged continued emphasis in the national space effort on studies of the sun's visible surface, and of the radiations that come indirectly from its core where temperatures are some 27 million degrees Fahrenheit.

In a report on "The Sun," one chapter in a nine-part survey of space science, the Board outlines specific applications of space research to solar physics. The report was written by Dr. Leo Goldberg, chairman of

the University of Michigan's astronomy department.

Dr. Goldberg notes that the sun is an average star—average in brightness, surface temperature, size, mass, and perhaps even relative age. Because it is average, astronomers can apply knowledge gained from solar studies to the two extremes of bigger, brighter stars and smaller, fainter ones that are too far away for detailed observations of their surfaces.

The next nearest star, Alpha Centauri, is some 300,000 times as far as the sun.

However, despite the fact that the sun is only some 93 million miles from the earth, the amounts and kinds of information about it detected by earthbound instruments have proved inadequate for solving many basic solar problems. This is because the earth's atmosphere absorbs, deflects or alters most of the solar radiation.

Although the radiation from the sun as a whole is only very slightly variable, radiation from localized regions or in limited frequency ranges is extremely variable. This variability is associated with activity in the solar atmosphere in the form of sunspots, flares and prominences. Sunspot activity rises and falls in an 11 year cycle.

Dr. Goldberg suggests that observations made possible by balloons, satellites and space probes will answer many puzzling questions about the sun that are now understood only partially or not at all.

Among them are questions concerning the mechanism of the sudden onset and development of solar flares; the structure of the chromosphere, which is the unstable transition region above the sun's visible surface, in which the temperature rises from about 10,000 degrees Fahrenheit to about two million degrees in the corona; and the nature of the corona, the sun's tenuous outer atmosphere usually seen only at times of a solar eclipse. (See p. 364.)

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ASTRONOMY

Solar Theory Proposed

A THEORY for the birth of the solar system's sun and planets has been proposed by a Hungarian scientist.

Prof. L. Egged of Eotvos University in Budapest suggests that when the universe was very young, all matter in the solar system was concentrated in the sun. Because of this, the acceleration due to gravity in the sun was very great, and the sun's matter was highly concentrated. Its radius therefore was very small.

Since then, centrifugal force that would force material out from the center of the spinning sun and gravitational acceleration have been decreasing. This would result in an increase in the sun's diameter.

At some time far in the past, centrifugal

force became equal to the attraction of gravity at the solar equator, allowing part of the sun's mass to escape. This is how Prof. Egged suggests that the various planets were formed—thrown out one at a time from the sun, with the outermost first.

The currently accepted view of solar system birth is that the planets resulted from gravitational attraction caused by eddies left by the original material forming the sun.

Prof. Egged reported in *Nature*, 186:617, 1960, that his theory could also be applied to the formation of satellites circling the planets, such as those found around Jupiter.

Science News Letter, June 4, 1960

ASTRONOMY

Scale for Universe Wrong

ASTRONOMERS may be using a faulty "yardstick" to measure the vast distances of the universe.

Dr. Paul W. Hodge of Harvard College Observatory reports recent studies have shown that the methods now used for determining distances to galaxies far beyond the Milky Way galaxy, in which the sun and its planets are located, are incorrect.

These methods are based on comparing the apparent brightness of stars in the astronomically "close" galaxies with the brightness of the same kind of stars in the Milky Way.

Distances in the universe are then determined from measurements of distances of these nearby galaxies. However, Dr. Hodge reports in *Nature*, 186:618, 1960, detailed examination of the light from certain objects in the Magellanic Clouds shows that brightness comparisons should not be used as an index of distance.

Distances to galaxies beyond the Milky Way are measured in many thousands or millions of light years, which is the distance covered in one year by light traveling 186,000 miles a second.

Science News Letter, June 4, 1960

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SEISMOLOGY

Quake Near World Record

An earthquake as strong as the San Francisco quake in 1906, and close to the world's strongest, hit southern Chile. Resulting tidal waves spread across the Pacific.

THE STRONGEST earthquake that hit Chile, May 22, had a magnitude of 8.25 to 8.5, the University of California at Berkeley reported. This comes close to the biggest earthquake ever recorded that took place in Ecuador in 1906. It had a magnitude of 8.9.

Of a series of earthquakes hitting Chile, the first one took place Saturday morning at 10:02 Greenwich time, May 21. It had a magnitude of 7.25 to 7.5. After this, continual tremors occurred Sunday and Monday, with three major quakes Sunday afternoon within 16 minutes. They hit at 18:55, 19:10 and 19:11, Greenwich time, with magnitudes of 7.75, 7.5 to 7.75 and 8.25 to 8.5, respectively.

U. S. Coast and Geodetic Survey scientists said that the shock waves came so fast and heavy on May 22 that the seismograph hit the stops for hours—the needle kept registering all the time as the waves repeatedly circled the earth. The afterquakes were even heavier than the quakes themselves, they reported.

A seismologist said that between 6 p.m. Sunday and 9 a.m. Monday alone, ten quakes registered in Washington, D. C., six of fairly large magnitude.

He said that this is by no means all the

tremors that had occurred during this time since the instruments are kept less sensitive because weather fronts moving toward the coast from the west create "noise" for the seismographic instruments.

He also said the shocks and aftershocks keep coming in all the time. The general pattern for earthquakes is that a series of small quakes will announce the large, major ones. He said that normally the first large earthquake, which occurred Saturday, would have been thought the major one until the even heavier ones occurred Sunday.

When the major quake has taken place there is generally a series of smaller aftershocks before the total ground motion ceases. He said the aftershocks can last for months. Aftershocks from the earthquake in Yellowstone Park last August were registered in January and February of this year.

Thousands of people were reported killed in the Chile quakes, and damage so far cannot be estimated. All communication south of Santiago, the capital of Chile, was disrupted. Some of the cities and towns involved in the earthquake are: Concepcion, Chiloe, Angol, Los Angeles, Temuco, Valdivia and Osorno.

A railroad bridge over the Malleco river

—called a modern engineering feat—was demolished.

Seven volcanos were reported erupting and three new ones appeared in the earthquake area, and debris was hurled 10,000 feet up in the air.

A tidal wave, resulting from the earthquakes, hit the island of Chiloe Sunday afternoon and tidal waves occurred on Monday as far away as San Francisco, Tahiti, Christmas Island and Hawaii.

Warning Network

TWELVE HOURS before seismic sea waves hit Hawaii and killed many persons, officials there were advised of the wave and told when it would hit, the U. S. Coast and Geodetic Survey reported. The waves hit May 23, at 10:22 Greenwich time—just 22 minutes later than the time predicted.

The Pacific's tidal wave warning network was set up by the U. S. Coast and Geodetic Survey after waves in 1946 had devastated Hawaii. Twenty-one Pacific tide stations are now in operation.

They have only part-time employees who wind clocks and record data.

But after seismic stations have located a quake that might cause a wave, the part-time employees are told to man their stations. They then send the exact time the tidal wave crests at their stations to the Honolulu Magnetic Observatory of the Coast and Geodetic Survey. The Observatory is the center of the Survey's seismic sea wave net.

From the stations' reports the Observatory can figure the speed of the waves and predict when they will hit other areas.

Quick communication throughout the net is made through the military radio system. The U. S. warning network is the only one of its kind in the world. It operates only in the Pacific. The eastern U. S. is protected from Atlantic tidal waves by the Continental Shelf.

How Tidal Waves Begin

Tidal waves originate from irregular trenches on the ocean floor.

Oceanographers believe earthquakes cause great landslides at these trenches and that the landslides start the sea waves. Thus, oceanographers frown on the name "tidal wave," which implies the wave is caused by the moon and sun, as are tides.

The scientists prefer "seismic sea wave" because it better indicates the cause and nature of the waves. And a Japanese term, "tsunami," is favored in many scientific journals.

The tidal wave cannot be seen at sea. In fact, ships head out to sea when warned of a tidal wave. The ships would be wrecked in port, where the waves reach great heights. But ships at sea are not hurt. People on the ships may not even notice the waves.

At sea, a wave may be a hundred miles long but will be only a foot or two high. It may travel at 400 to 500 miles an hour.

Science News Letter, June 4, 1960



FUEL-CELL CAR—A fuel cell, producing electric currents directly from chemicals, provides power for this racing car. The zinc-oxygen cell will be developed by Exide Industrial Division of The Electric Storage Battery Company in Philadelphia for electric industrial material handling trucks. After being tested in hauling operations, the cell may be adapted to automobiles and ordinary trucks.

METEOROLOGY

Warmer Climate for U. S.

THE CLIMATE of the continental United States has grown warmer since the beginning of the 20th century, a Weather Bureau meteorologist reports.

Dr. H. E. Landsberg compared the monthly seasonal and annual temperature means at 48 locations for the two 25-year periods from 1906 to 1930 and 1931 to 1955. His preliminary analysis is based on temperature records from rural stations, since those from cities are not as reliable for this purpose due to the heat they generated in cities.

The temperatures in most places show "significant rises," Dr. Landsberg reports in the *Journal of Geophysical Research*, 65:1519, 1960. Annual rises of one and a half degrees Fahrenheit were found over the Great Lakes region and in the Rocky Mountain states.

The average of 48 stations showed an annual rise of eight-tenths of a degree between the two time intervals. Forty of the 48 stations showed an increase in temperature, which Dr. Landsberg calls "over-

whelming evidence of a tendency toward warming."

When the values of annual temperature change are averaged by zones, Dr. Landsberg found that the higher latitudes have the larger change. This agrees with previous findings in other regions of the Northern Hemisphere that the climatic warming has been most pronounced in the higher latitudes.

Dr. Landsberg also compared precipitation totals from the 48 stations for the two 25-year periods. For the most part, he found, precipitation changes are probably not significant. However, there was a tendency toward lower totals over the Rocky Mountain states, parts of the Great Plains and in an area west of the Appalachian Mountains.

On the basis of present knowledge, Dr. Landsberg concluded, there is no indication of a major trend in the rainfall patterns of the contiguous 48 states.

Science News Letter, June 4, 1960

VIOLOGY

Heredity Breakthrough

TWO VIROLOGISTS announced that they have pinpointed, in a virus, the exact spot affected by a mutation, or change in heredity. This observation is a major step toward understanding and possibly controlling the heredity of living things.

With this discovery, Drs. A. Tsugita and Heinz L. Fraenkel-Conrat of the University of California's Virus Laboratory, Berkeley, Calif., added another link to the growing chain of facts unearthed by studies of tobacco mosaic virus.

It is already known that a virus can be separated into two major parts, the nucleic acid "core" and the outer coat made of protein. In the tobacco mosaic virus and some other viruses, the nucleic acid is ribonucleic acid, RNA. This is the part that controls the reproduction, growth, appearance and other characteristics of these viruses.

The discovery by Drs. Tsugita and Fraenkel-Conrat was made in the protein coat of the virus. The change in the coat means that a change has occurred in the core part of the virus, where the control of heredity changes is centered, they believe.

They took the tobacco mosaic virus apart, separated the coat from the core and treated the naked core with nitrous acid to induce the artificial mutation. Then they put the pieces back together again and let the virus grow and reproduce. The mutant offspring were then put on tobacco plants and were allowed to cause disease.

The disease symptoms they produced were a bit different than those produced by regular tobacco mosaic virus, and the mutant virus even preferred a different type of tobacco plant.

The protein coats of the mutant offspring were chemically analyzed. In three of the 158 parts of the characteristic protein molecule, there had been a change. Three amino acid components had been displaced and three different ones had been substituted.

To determine exactly where one of these changes was located along the 158-link protein chain, the virologists subjected the molecules to enzyme analysis. The change had occurred exactly three links up from the end of the normal protein chain.

Dr. Wendell Stanley, Nobel director of the Virus Laboratory, said that finding this landmark may furnish scientists "a Rosetta Stone for the language of life," a key to the language of genetic transfer of characteristics.

Dr. Fraenkel-Conrat was asked, if it will eventually be possible chemically to change the part of the RNA that causes the disease-producing character of the virus and thus render it a harmless organism.

"Yes," he said, "sometime far, far in the future it should be possible to do so. But we are a long way from it at this point."

Science News Letter, June 4, 1960

EDUCATION

Tend to Get Lower Grades When Starting College

COLLEGE students tend to get grades that are half a grade point lower than grades they received in high school, a six-year study in Corvallis, Ore., reveals. This means, for example, that students with B averages in high school make about B minus or C plus averages during their

first year of college. Dr. D. T. Ordeman, registrar at Oregon State College, arrived at these findings after carefully charting the classroom performances of freshmen and comparing them against their high school records. Averages "go out the window" in many cases, however, Dr. Ordeman noted. This year, 323 of 1,935 freshmen had grades that were better than their high school averages.

Science News Letter, June 4, 1960

CONSERVATION

Chemical Method Saves Shellfish From Killers

A CHEMICAL method to keep oysters and clams from being killed by their enemies has been found by three Government scientists.

Heavy oils mixed with sand can be used to surround shellfish beds to control the snails, starfish and, in some cases, crabs that kill oysters and clams. The chemical control method is still in the experimental stage and is not yet recommended for commercial application.

However, the chances are good that the basic principles of the method will solve the age-old problem of protecting shellfish from predators. Some control over shellfish enemies has been needed since oysters and clams were first harvested for food, the researchers report in *Science*, 131:1522, 1960.

Drs. V. L. Loosanoff, C. L. MacKenzie Jr. and L. W. Shearer of the U. S. Fish and Wildlife Service's Biological Laboratory in Milford, Conn., developed the method for chemical control using such heavy oils as orthodichlorobenzene mixed with dry sand or other inert material to hold them in place on shellfish beds.

Effects of the treatment, they report, can be increased by adding other chemicals, such as the insecticide Sevin, to the heavy oils.

The method prevents boring gastropods, starfish, crabs and other enemies of bivalves from invading shellfish beds, and also makes the beds unsuitable for their continued existence.

Science News Letter, June 4, 1960

ZOOLOGY

Rain Triggers Duck Breeding

NOMADIC WILD DUCKS inhabiting the arid interior of Australia breed only when sporadic rains fill the dry creek beds and backwaters or cause a sharp rise in water level in running streams, H. J. Frith of Australia's Wildlife Survey Section found.

When breeding is finished and the water evaporates, the duck population moves elsewhere. The inland rains are rarely seasonal and floods or heavy rains at any time of the year initiate breeding.

In the Australian pink-eared duck, the process of adaptation is carried a step further. Breeding begins only when flooding of adjacent low-lying land occurs because the rising water level leads to an increase in insect food for ducklings. Breeding of the insects is also stimulated by the water.

Science News Letter, June 4, 1960

MEDICINE

Esophagus Cancer Test

Tumors are detected with ultraviolet light in a test for cancer of the esophagus. Beards will protect against the sun, and all bites should have rabies treatment, doctors report.

AN EASY WAY to detect cancer of the esophagus, or gullet, has been reported.

Dr. Herman J. Moersch of Rochester, Minn., director of education and research, American College of Chest Physicians, told the Illinois State Medical Society annual meeting in Chicago:

"Hematoporphyrin, a derivative of hemoglobin—the oxygen-carrying red pigment of the red blood corpuscles—if injected into the blood stream, will accumulate in the tumor.

"When esophagoscopy examination is done with the use of ultraviolet light, the tumor presents a very striking iridescent light which can be very easily detected."

Early diagnosis, Dr. Moersch explained, is necessary for successful treatment of carcinoma of the esophagus. The disease frequently progresses too far for operation before it produces obvious symptoms.

Patients tend to overlook the earliest symptom, which is difficulty in swallowing a large mass of food. By avoiding the larger particles and chewing food more

thoroughly, they get rid of the difficulty. It is often impossible to operate by the time they have further trouble and go to their doctors.

Surgery and X-ray treatment are the two most reliable methods of treating cancer of the esophagus. Dr. Moersch said some spectacular results have been obtained in certain cases by use of the cobalt bomb and roentgen therapy. He said it is hard to select the cases that will respond to this therapy.

Only half of the patients seeking medical care for this disease can be operated. Of these, 60% have successful operations, and it is estimated that about 17% will live five years or more.

Science News Letter, June 4, 1960

Advises Beards

Dr. Hans M. Buley, director of the Christie Clinic, Champaign, Ill., speaking also at the annual meeting of the Illinois State Medical Society in Chicago, advised

farmers to grow beards, if necessary, to protect themselves against the harmful effects of the sun.

Pointing out the dangers of solar radiation, he said protection is needed especially during the middle of the day. He advised light clothing to cover the arms and neck as well as wearing a hat when riding a tractor or combine.

Science News Letter, June 4, 1960

Warns of Rabies Danger

EVERY BITE by a domestic or wild animal should have emergency first aid treatment for rabies, Dr. Karl Habel, chief of the laboratory of biology of viruses at National Institutes of Health in Bethesda, Md., told the Illinois State Medical Society meeting in Chicago.

He said every bite raises the question of possible exposure to rabies.

"The immediate mechanical washing out of the bite wound with encouragement of bleeding tends to remove any rabies virus," he said, advising the use of soap and water.

Whether antirabies serum is given depends on the health of the biting animal. If the animals cannot be found, if the animals are wild (bats are especially dangerous), or if children get severe bites in localities where rabies is prevalent, vaccine is recommended.

Science News Letter, June 4, 1960

MEDICINE

TV Technique Used In X-Ray Fluoroscopy

A PATIENT can now watch his own X-ray fluoroscopy examination if he wishes. A new technique also makes it possible for teams of consulting doctors and medical students to view diagnostic images on a television-like screen.

Dr. Russell H. Morgan, professor of radiology at The Johns Hopkins University, Baltimore, Md., predicted that the new equipment will be used increasingly in all hospitals, large and small, in the future.

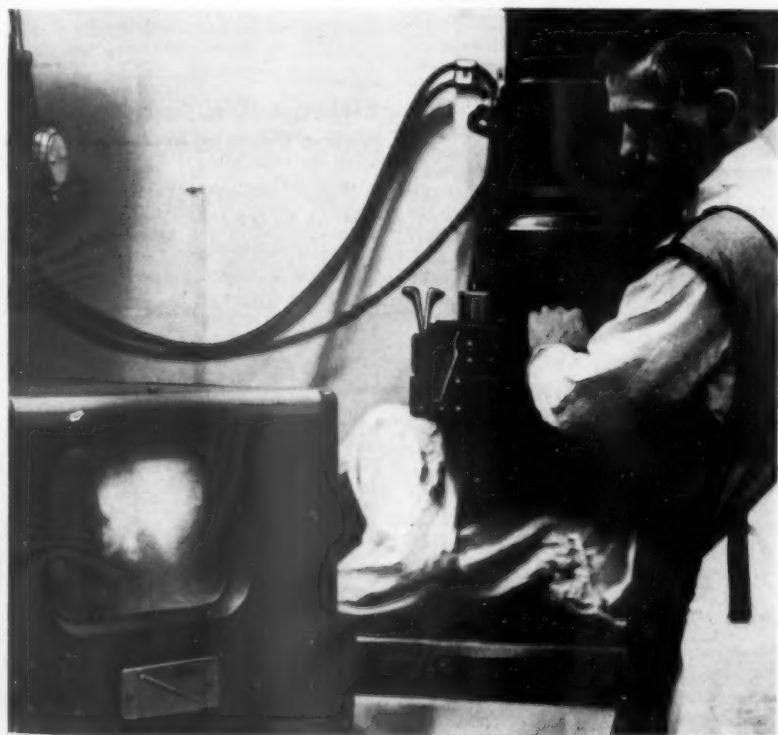
Speaking at the second of a series of X-ray forums for science writers sponsored by the American College of Radiology, Dr. Morgan said less radiation was needed for cinefluorography or X-ray motion pictures with the new system.

The Johns Hopkins method, which converts X-rays to light rays and displays them on a fluoroscopic screen, is one of four systems investigated for X-ray image intensification. Dr. Morgan said it is the one of greatest interest in the United States today.

Other methods include television systems optically coupled to conventional fluoroscopic screens, "flying spot" television and television systems with X-ray sensitive detection tubes.

One advantage of the TV method is that examinations do not have to be made in a totally blacked-out room. This is easier on the eyes and saves the time required for adapting the eyes to darkness.

Science News Letter, June 4, 1960



X-RAYS ON TV—Television monitor set shows Walter Ciceric of Johns Hopkins University a side view of abdomen of patient lying on the table. X-rays, converted into light rays, are intensified 50,000 times.

NUTRITION

Fluorides' Action in Body Reported to Symposium

FLUORIDES in water become deposited in teeth and bones, or are quickly excreted from the body, research shows.

Dr. Harold C. Hodge, pharmacology professor at the University of Rochester School of Medicine and Dentistry in Rochester, N. Y., traced the distribution of fluorides by injecting radioactive fluorides into the blood. He reported findings on this and other research on the metabolism of fluorides at a symposium in Boston, sponsored by the American Medical Association's Council on Foods and Nutrition.

Dr. Hodge said the fluorides, often added to water to prevent tooth decay, are quickly removed from body fluids. He said fluoride is excreted rapidly and almost entirely in the urine. This is of industrial importance, he noted, because the "prompt and considerable urinary fluoride excretion" provides a guide to fluoride exposure to protect workmen from excessive, undetected exposure to fluoride. He said there is no evidence that small concentrations of fluoride have a harmful effect on kidney structure or function.

Pointing out that although "fluoride is the bone-seeker par excellence," Dr. Hodge said there is a slow loss of the deposits in the skeleton, or bone structure, through several mechanisms. When fluoride-rich crystals are dissolved, the fluoride may be translocated but is usually removed from the body in urine.

Science News Letter, June 4, 1960

PSYCHOLOGY

First Men in Space Will Not Have Many Decisions

THE FIRST MEN in space will not often be called upon to make decisions in the ordinary sense of the word. For the most part the decisions will be limited to a simple matter of interpreting what the instruments indicate and taking the appropriate prescribed action.

The decision is no more difficult than that of a motorist waiting at a red light who must decide to go when the light turns green.

Yet even when such "decisions" could just as well be made by a machine, the "thinking" will be done by humans in the interests of equipment simplicity, weight and reliability. Dr. Alec Williams of Hughes Aircraft Company, Culver City, Calif., told a Conference on Human Decisions in Complex Systems, held under the auspices of the New York Academy of Sciences in New York.

In case of emergency or near emergency, improbable situations may arise where no definite course of action has been prescribed in advance. In this case, the operator will really have to make a decision.

Decision-making is similarly unnecessary for most personnel in a missile operation system, Dr. John E. Mangelsdorf, a psychologist of Lockheed Aircraft Corporation,

Sunnyvale, Calif., told the meeting. Even when the missile system is in a stage of development, 90% of the personnel function as a kind of animated electronic part.

Examples of this kind of work include that of the stenographer who produces a finished letter from dictation or the machinist who produces finished parts from machine drawings or the electrician who produces actual circuits from wiring diagrams.

The remaining 10% of the personnel is a "creative minority," who are responsible for all significant decisions. Some way should be found, Dr. Mangelsdorf urged, to emancipate the creative minority from paper handling and leave these few decision makers free to perform creative activity and to make the few necessary decisions and plan what the 90% will do.

Science News Letter, June 4, 1960

SURGERY

Toe Joints Function In Patients' Hands

TRANSPLANTING a patient's toe joints and amputated fingers to his hand can restore the hand's vital grasping function.

Dr. Martin A. Entin of the Royal Victoria Hospital in Montreal, Canada, told the American Association of Plastic Surgeons in Milwaukee, Wis., that three years after these operations, the joints are functioning.

Describing the transplants in six patients ranging in age from eight to 68, Dr. Entin said the joints were taken from the patient's little toe in some cases. In others the joints were salvaged from fingers previously amputated from the patient.

There was no pain or discomfort during observation periods varying from six to 36 months, during which the joints were seen to be functioning satisfactorily.

X-ray showed some loss of normal shape but all the bones healed well. The reconstructed joints had a useful range of motion, between 10 and 30 degrees.

Dr. Entin said that although permanent "survival of the bone and joint component as an entity does not always take place," this is a practical procedure because of the painless aspects and the fact that some motion remains.

Science News Letter, June 4, 1960

GEOPHYSICS

Unusual Lightning Flash Lasts Two Seconds

AN UNUSUAL lightning flash, consisting of a record 54 current surges that lasted two seconds, is reported by three New Mexico scientists.

Drs. E. J. Workman, M. Brook and N. Kitagawa of the New Mexico Institute of Mining and Technology, Socorro, found that the path length for the final strokes of the lightning flash was about five and a half miles. The number of strokes and the total duration are believed to set records.

Their scientific study of the flash, which occurred over New Mexico last summer, is reported in the *Journal of Geophysical Research*, 65:1513, 1960. The unusual event was photographed with two different moving-film cameras.

Science News Letter, June 4, 1960

IN SCIENCE

PHARMACOLOGY

Test Effect of Drugs On White Blood Cells

BECAUSE SEVERAL of the wonder drugs, especially sulfa, can dangerously reduce the white blood cell count, New York University's biology laboratories have developed a new simple technique to reveal such dangers in prospective drugs.

In the new method rats are first exposed to a sub-lethal dose of X-radiation. This dose reduces the white cell count. The drug is then given to some of the sensitized animals, while other exposed rats are kept as controls.

If the drug does have the potential of reducing the white cell count, the blood of animals both injected and radiated regains its normal count more slowly than the blood of the rats that underwent radiation only.

The technique was developed by Dr. Harry A. Charipper, head of NYU's all-university department of biology, Dr. Anna M. Slicher, former graduate assistant in the department, and Dr. Edgar N. Grisewood, associate professor of physics at NYU's Washington Square College of Arts and Science and lecturer on radiology at the University's School of Medicine.

Science News Letter, June 4, 1960

MEDICINE

Vitamin Pill Substance Hides Pernicious Anemia

A WEST VIRGINIA doctor wants manufacturers to leave the folic acid out of their multivitamin pills and iron tablets.

This substance, says Dr. A. B. Curry Ellison of Charleston Memorial Hospital, is capable of correcting the blood picture in patients with pernicious anemia. But it does nothing for the neurologic or gastric aspects of the disease.

When a doctor does not see the characteristic faulty blood picture, he spends precious time groping in the dark, trying to find the cause of the stomach and nervous trouble, not suspecting that folic acid has masked the pernicious anemia.

Folic acid has been included in vitamin preparations since about 1946, Dr. Ellison reports in the *Journal of the American Medical Association*, 173:240, 1960. Since that time six cases of folic acid masking have been reported by other workers and Dr. Ellison adds two more to the list for a total of eight.

The daily requirement of folic acid for the human being has not been determined, but on the basis of animal studies, one-tenth to two-tenths milligram per day has been suggested. If a patient needs extra folic acid, Dr. Ellison believes, he should take it as a separate pill.

Science News Letter, June 4, 1960

THE FIELDS

MEDICINE

Blue Dye Test Detects Abnormal Tissue Protein

A DANISH DOCTOR has found a new way to detect amyloidosis, a condition that often precedes or accompanies diseases such as tuberculosis, osteomyelitis, lung abscess or gummatous syphilis. His technique uses blue dye rather than the presently used red dye.

In amyloidosis an abnormal protein complex with starchlike characteristics, called amyloid, accumulates in various body tissues. The usual method for detecting this condition is to inject Congo red dye into the blood stream. If the dye is cleared from the blood faster than normal, the patient is generally believed to have amyloidosis.

The point that doctors do not agree on is just how fast and how much of the red dye must be removed from the blood, Dr. Stig Jarnum of Bispebjerg Hospital, Copenhagen, believes.

Quite by accident Dr. Jarnum found that Evans blue dye, which is routinely used for blood plasma-volume determination, is removed at an abnormally high rate from the blood of amyloidosis patients.

The Evans blue diagnostic method may turn out to be more specific than the Congo red test, Dr. Jarnum reports in *The Lancet*, 1:1007, 1960. The reason, he reports, is that rapid removal of Evans blue can only be due to an abnormal non-circulating protein, amyloid, that can catch and hold the dye.

This diagnostic technique may be even better when used in conjunction with radioactive tracers. And it is particularly valuable when the patient is allergic to the Congo red dye.

Science News Letter, June 4, 1960

SURGERY

Hospital Coronary Unit Proposed to Save Lives

A CANADIAN surgeon proposes that every hospital set up facilities for emergency treatment of victims of coronary attacks.

These facilities would include two emergency rooms, and heart-specialist nurse, intern, and anesthetist.

If the attending physician were not available, this heart team would go into action without him.

Dr. W. Carleton Whiteside of Victoria, B. C., proposes the coronary unit in the *Journal of the International College of Surgeons* (May, 1960). The plan is especially for victims of coronary insufficiency in which portions of the heart muscle are suddenly starved and die. A blood clot in the heart's own arteries, or hardening of these arteries, or both, can bring on this attack.

Under Dr. Whiteside's plan, a patient would be rushed to the local unit, where morphine and oxygen would be given to relieve pain and shock. Then because of the lowered output of the heart, he would be covered with ice blankets to lower his temperature.

In this modified form of suspended animation, his metabolism would be slowed to a level his weakened heart could maintain. Dr. Whiteside reports this could be kept up for several days if necessary. In extreme emergencies the patient's chest would be cut open and his heart massaged by hand.

"No one will be accused of a crime for trying to restore life. Three to four minutes can mean the difference between life and death in such situations," he points out, adding that it would often be fatal to wait for a surgeon.

Science News Letter, June 4, 1960

GEOPHYSICS

Sputnik III Measures Oxygen in Ionosphere

THE RUSSIAN SATELLITE Sputnik III has measured atoms of oxygen called atomic oxygen at altitudes between 135 and 590 miles, the National Aeronautics and Space Administration has reported.

Nitrogen oxide, molecules of nitrogen and atoms of nitrogen were also found at the same altitudes, a Russian report, translated by NASA, said.

Data obtained by the Sputnik at latitudes 27 to 67 degrees north showed that the composition of the ionosphere at these altitudes differs with latitude. The relative density of oxygen atoms appeared greater at latitudes ranging from 55 to 65 degrees north than in the latitudes farther south. This was also true of molecular oxygen and nitrogen oxide.

Science News Letter, June 4, 1960

ROCKETS AND MISSILES

Helicopter System To Save Boosters

A HELICOPTER-LIKE system could be added to the main stage of a rocket and would permit the rocket engine to glide back to earth for re-use. This would save millions of dollars.

As proposed by engineers of the Bell Helicopter Corporation, a control system would automatically activate rotor blades once the first stage is free of the rest of the rocket so it could float to earth while buoyed by auto-rotating helicopter blades. Preliminary studies of the system have been reported. For slowing or controlling descent, the operation of the rotor blades could be controlled from the ground so that the booster could be guided back to the launching point or directed to an auxiliary landing pad elsewhere.

All the development costs involved in the rotor system would be paid for by the savings from the first rocket engine re-used.

Science News Letter, June 4, 1960

ROCKETS AND MISSILES

Device Slows Fast Rockets To Protect Nose Cone

A MEANS of slowing down the fastest rockets and jet planes has been patented. The purpose of this device, which was granted patent No. 2,936,710, is to slow down a missile sufficiently to allow the use of a parachute and at the same time to protect the nose cone of the missile in which instruments may be housed.

William Bollay of Pacific Palisades, Calif., the inventor, assigned his patent to the Curtiss-Wright Corporation of Delaware.

The device consists of a cylindrical shell fitted around the body of the missile just behind the nose cone. When not in use, this shell fits flush with the surface and offers no more air resistance than would the normal skin of the missile.

To decelerate the missile, this cylinder is thrust forward by rods attached to a high pressure piston and cylinder within the body of the missile until the front edge is level with the nose. This forms an air pocket in front of the missile to slow down the missile's flight and at the same time to destroy the aerodynamic lifting properties of the nose cone.

Science News Letter, June 4, 1960

SURGERY

Refrigeration Preserves Kidney During Surgery

A HUMAN KIDNEY can be refrigerated and preserved during surgery with a new device that uses the same principle which helps to condition the cabin air of modern aircraft.

The technique was developed in a co-operative program between Dr. Abraham Cockett of the division of urology of the University of California Medical School and the Garrett Corporation, both of Los Angeles.

The unit, which operates on the principle of air-to-liquid heat exchange, is a stainless steel container about the size and shape of a kidney and lined with surgical sponge.

Through a special inlet and outlet, a water-alcohol solution can be circulated through the hollow walls of the unit.

During surgery in which blood flow to the kidney must be temporarily interrupted, the device is fitted around the kidney. A circulating refrigerant keeps the kidney at temperatures between 55 and 68 degrees Fahrenheit.

Thus the kidney tissue, which ordinarily deteriorates rapidly when its blood supply is interrupted, is preserved until circulation is restored.

In cases where half of the kidney must be removed because of disease, a special half-size unit is placed around the normal half of the kidney.

Other surgical procedures in which the device is used are in removal of fatty plaques from the kidney artery and in certain types of abnormal surgery in which the kidney artery must be clamped.

Science News Letter, June 4, 1960

GENERAL SCIENCE

Bringing Up a Scientist

Parents of top young scientists advise that children meet working adult scientists. One father suggests a home life in which a child's emerging viewpoint is tested by family debate.

By SHIRLEY MOORE

"LET YOUR CHILD reach for the moon; he may be on his way before you know it!" the mother of one top science student says.

For a special survey, this mother and the parents of 39 other top science students described the methods they used in guiding their children toward excellence in science. The parents' children were all 1960 winners of the 19th Science Talent Search recently conducted by Science Clubs of America for the Westinghouse Science Scholarships and Awards.

One of the fathers, a physics professor, said it is very important to give a young person the sort of home life "in which his emerging viewpoint is continuously tested by friendly debate." The father added: "A child must be accompanied in his interests; he must not be either led or pushed."

Most of the parents agreed. Never push, they said. But be ready to go along with children's ideas and schemes. Four-fifths of the mothers and fathers agreed on the value of encouraging science-prone youngsters to improvise equipment.

For example, one mother cautioned against supplying special materials and tools until the child asks for them and shows clear evidence of his ability to make use of the devices he already has.

Another parent suggested that a new camera or microscope sometimes should be postponed until the young experimenter has thoroughly explored all the possibilities of the old one. Two-thirds of the mothers and fathers advised emphasis on research for the pure joy of the search, not mainly for honors and prizes.

Kits Thought Valuable

Half of the parents considered experimental kits and similar materials valuable. The mother of one of the nine girl winners said kits should be chosen which will offer a challenge, not merely pat answers.

More than half of the parental group advised that young people with potential science ability should be actively exposed to working adult scientists. However, one parent suggested that this should not be done before their self-development and confidence has been established by creative use of their own devices, materials and tools.

The parents mentioned 84 teachers who exerted potent influence on these student-scientists from the age of 7 to 17. The height of teacher inspiration was in the years from 12 to 17. There were 42 mentions of scientists whose help and example were very effective during the period between 13 and 17 years of age.

In 32 cases parents also designated themselves, or each other, as important influences throughout their children's lives.

Other individuals who were mentioned included adult friends, classmates of their children, leaders of science clubs, Scout troops and camp groups, and advisers of library and museum organizations.

Toys and play materials that contributed to their children's development were listed by the parents as follows: Chemistry sets for over 50% at ages ranging from six to 12, construction sets for 40% at ages from four to ten, and educational kits and science toys for 25% from one to 14 years of age. Another 18% mentioned microscopes. But 12% mentioned no particular play materials as having been significant.

The parents listed 37 textbooks and semi-technical books on specific fields of science that absorbed their children from the time they could read until the present and 15 children's series and general books on science, popular at pre-school ages and at six, eight and nine years old. From the pre-school level until 10 years of age, encyclopedias were important to six youngsters.

Fiction and science fiction each stirred the imagination of four young people.

Books ranging from almanacs to Darwin's *Origin of the Species* impressed the pre-

scientists, with Dr. George Gamow's books claiming their enthusiasm at such early ages as 11, 13, 14, and 15.

Such magazines as *Scientific American*, *SCIENCE NEWS LETTER* and *Natural History* have been valuable to a large number of the students. Visits to museums, observatories and planetariums, and professional, industrial and university laboratories were also important.

One-half or more of the young scientists found experience and inspiration in science fairs and science clubs, while Boy and Girl Scouts, mathematics contests and National Science Foundation summer programs for high school students helped several.

Educational TV Stimulates

Educational television courses stimulated the interest of 40% of this group, according to their parents. Mothers and fathers of 25% felt that television in general had little or no effect upon the development of their children.

Nearly universally reported hobbies were collections of everything from rocks, insects and stamps to skunks; sports; photography; reading and music. But parents also listed chess at five and ten years of age, paleontology at six, astronomy at seven, microscopy at eight and mathematics at nine and ten.

It is evident that the parents of these developing scientists practiced the precept of one of the mothers who said:

"The parents' attitude that the entire world is fascinating is most important."



DINING ROOM TABLE SCIENCE—This scientist-father enjoys helping younger generation scientists over the "rough spots" in their projects. *Science* moves into the dining room as his son and a friend work on experiments. The importance of such companionable "going along" with the interests of children was emphasized in a *SCIENCE SERVICE* study of the parents of the 40 winners of the 19th Science Talent Search.

And four-fifths of the parents said aspiring young scientists should be encouraged to enjoy activities quite outside of science.

"Don't panic if he is considered 'odd' as long as he is not unhappy," says one parent, "but encourage him to broaden his interests and contacts to avoid becoming too solitary."

Such broadening insures against a child's "becoming too one-sided in personality," as another parent put it.

Still another parent added that all developed talents are valuable for future use and will combine in the young person's eventual main interest.

Highlights abstracted from additional suggestions offered from what some of the parents would call "hindsight wisdom" include:

1. Show confidence in your children's abilities and leave them alone to work out their projects.

2. Never underestimate what they might be able to accomplish.

3. Don't be a "good housekeeper" at the expense of your child's prize collections.

4. Combat the "work versus fun" concept by letting them know that you find work a vital part of your life.

5. Make home a place of warmth, stability, democracy, continuity.

6. Expose children to alert minds as well as to challenging printed materials.

7. Use infinite patience in listening and always show keen interest in any topics they want to discuss.

8. Provide space for adequate storage and use of scientific equipment.

9. Provide quiet time, alone.

Encourage children to be individualistic. As one couple said, "conformity to stereotyped ideas, we feel, can be stifling to the budding scientific personality. A strong sense of integrity, dependability and character should be stressed. Discipline and self-discipline should be emphasized from early childhood.

Science News Letter, June 4, 1960

PUBLIC HEALTH

Air Pollution Linked to Ills

MANY DEATHS from heart disease and cancer may be related to air pollution.

Two analytical statisticians from the Department of Health, Education and Welfare in Washington, D. C., reported the relationship at the annual meeting of the Air Pollution Control Association in Cincinnati, Ohio.

Richard Schiffman and Emanuel Landau presented information based on a study of 163 standard metropolitan areas that were ranked in terms of potential air pollution levels. Those with highest air pollution had a greater number of deaths from various diseases than the national average.

Chronic rheumatic heart disease, arteriosclerotic heart disease, including coronary, and non-rheumatic chronic endocarditis were three that showed mortality increase

in 20 standard metropolitan areas studied.

Similarly, cancer of the esophagus and stomach caused more deaths in 20 metropolitan areas with high air pollution than the national average, while cancer of the trachea, bronchus and lung showed comparable mortality increases.

The need for further study to show types of industries, fuels used and other factors related to air pollution and morbidity was emphasized.

Other investigators minimized the "overwhelming importance" of cigarette smoking as a prime cause of cancer, which has been alleged by many researchers. They said that frequency of lung cancer started on the European continent before cigarette smoking became popular.

Science News Letter, June 4, 1960

ARCHAEOLOGY

Valuable Sites Protected

VALUABLE archaeological sites uncovered by freeway-building operations in California are being protected by a unique co-operative program among two state agencies and the University of California at Los Angeles.

The program involves the State Division of Highways, Division of Beaches and Parks and the UCLA Archaeological Survey. The Survey is headed by M. B. McKusick.

Here is the problem: Several years ago it became apparent that the vast California highway building program might bury forever many of the sites of California's prehistory and early history unless something was done to record and preserve some of the remains. The problem was particularly acute in southern California, whose coastal region, the site of major highway programs, is archaeologically rich.

Here is the way it is being solved: Whenever possible the UCLA Archaeological Survey is furnished with maps on which projected rights-of-way are plotted.

The right-of-way is then explored by an archaeological crew.

Occasionally a few sites are missed during the initial survey or there is not time for thorough study before highway construction starts.

When a bulldozer turns up evidence of a missed site the word is flashed to Sacramento and then back down to UCLA.

Shortly afterward a special "emergency" archaeology crew is in the field retrieving ancient cultural remains from the path of the roadbuilders.

A similar program is being negotiated by UCLA with pipeline building organizations.

Science News Letter, June 4, 1960

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ACRONYMS DICTIONARY: A Guide to Alphabetic Designations, Contractions and Initialisms—Gale Research Co., 1st ed., 211 p., \$10. Lists more than 12,000 acronyms of associations, government agencies, business firms, transport facilities, military and general terms.

ADVANCES IN THE ASTRONAUTICAL SCIENCES, Vol. 5—Wernher von Braun and others—Plenum Press, 356 p., illus., \$8. Proceedings of the 2nd Western National Meeting of the American Astronautical Society, Los Angeles, 1959.

BIOLOGY AND CONTROL OF THE WESTERN PINE BEETLE: Summary of the First Fifty Years of Research—J. M. Miller and F. P. Keen—USDA (GPO), 381 p., illus., \$2.25. Reviews the results of research done by Forest Service entomologists.

CHEMICAL PERIODICITY—R. T. Sanderson—Reinhold, 330 p., illus., \$11.75. This textbook attempts to emphasize the fundamental unity of inorganic chemistry.

COLOUR IN INDUSTRY TODAY: A Practical Book on the Functional Use of Colour—Robert F. Wilson, foreword by Faber Birren—Macmillan, 90 p., photographs, \$8. Discusses science and psychology of color, and shows uses of lighting and color schemes.

THE DETERMINATION OF MOLECULAR STRUCTURE—P. J. Wheatley—Oxford Univ. Press, 263 p., illus., \$5.60. Introduction to spectroscopic methods, electron and X-ray diffraction, dipole moments and nuclear magnetic resonance.

ELECTRONIC ENGINEER'S REFERENCE BOOK—L. E. C. Hughes, Ed., foreword by Percy Dunsheath—Haywood & Co. (Macmillan), 2nd rev. ed., 1588 p., illus., \$18. Contains new sections on non-destructive testing, components,

radiation detection, digital computer applications, simulators and electronic telephone exchanges.

ELEMENTS OF GENERAL CHEMISTRY—Jay A. Young—Prentice-Hall, 466 p., illus., \$6.95. Aims at giving the student understanding of the properties of typical elements and compounds.

EVOLUTION ABOVE THE SPECIES LEVEL—Bernhard Rensch, transl. from German, foreword by T. Dobzhansky—Columbia Univ. Press, 419 p., illus., \$10. Well-documented outline of the major rules governing the processes of evolution, presenting a synthesis of the modern biological theory of evolution.

EXERCISE AND FITNESS: A Collection of Papers Presented at the Colloquium, 1959—Seward C. Staley, Chmn.—Athletic Institute, 248 p., illus., paper, \$3. Discussion of medical, physiological, nutritional and psychological aspects of exercise and fitness.

FORTY-FOURTH ANNUAL REPORT OF THE NATIONAL ADVISORY COMMITTEE FOR AERONAUTICS, 1958: Administrative Report Including Technical Reports Nos. 1342-1392, (Final Report)—GPO, 1494 p., illus., \$10.50. Covers the activities of NACA through the close of business, September 30, 1958, when it was superseded by NASA.

FREEZING AND DRYING OF BIOLOGICAL MATERIALS—Harold T. Meryman, Ed.—N. Y. Acad. of Sciences, Annals, Vol. 85, Art. 2, 233 p., illus., paper, \$3.50. Discussion of the physical aspects of freezing, freezing of living cells, and theory and practice of freeze-drying.

GREEK HOLIDAY—Anne Anthony—Icaros (Taplinger), 428 p., illus., 56 p. of photographs, \$6. Perceptive travel book, takes reader season by season on a tour of ancient, medieval and modern sites, meeting the people of Greece.

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MODERN ASPECTS OF INORGANIC CHEMISTRY—H. J. Emeléus and J. S. Anderson—Van Nostrand, 3rd rev. ed., 611 p., illus., \$7.75. Revised to include the most important developments in inorganic chemistry.

NEPAL: A Cultural and Physical Geography—Pradyumna P. Karan with William M. Jenkins—Univ. of Ky. Press, 100 p., illus., 35 maps, \$10. Large-format, up-to-date geography of Nepal, based on 1955 census data, and on author's field study and air reconnaissance.

NEW HOPE FOR YOUR HAIR: A Scientific Guide to Healthy Hair for Men, Women and Children—Irwin I. Lubowe—Dutton, 253 p., illus., \$3.95. Dermatologist presents in non-technical language facts about the growth, loss, disorders and treatment of hair.

NUCLEAR SPECTROSCOPY, Part A and Part B—Fay Aizenberg-Selove, Ed.—Academic, 621 p. and 526 p., illus., \$16 each. Volume 9a and 9b of Pure and Applied Physics. For the use of graduate students preparing for experimental research in nuclear spectroscopy and for specialists who wish to acquire broader understanding of the whole field.

OF NATURE, TIME AND TEALE: A Biographical Sketch of Edwin Way Teale—Edward H. Dodd, Jr.—Dodd, 63 p., photographs, \$3. Beautiful little book about a great naturalist's ways and work.

PHYSICS AND MEDICINE OF THE ATMOSPHERE AND SPACE—Otis O. Benson, Jr. and Hubertus Strughold, Eds.—Wiley, 645 p., illus., \$12.50. Proceedings of the Second International Symposium, 1958. Source of data on progress on the "vertical frontier."

PRINCIPLES AND PROCEDURES OF STATISTICS: With Special Reference to the Biological Sciences—Robert G. D. Steel and James H. Torrie—McGraw, 481 p., \$10.50. Presents statistical techniques and disciplines necessary to conduct experiments and analyses of experimental data.

RADIATIVE TRANSFER—S. Chandrasekhar—Dover, 393 p., paper, \$2.25. Unabridged and slightly revised version of work first published in 1950.

REVOLUTION IN TRANSPORTATION—Karl M. Ruppenthal, Ed.—Graduate School of Business, Stanford Univ., 153 p., \$4.75; paper, \$3.75. Transportation executives and other experts present developments, problems, and perspectives in their respective fields of transportation.

RIGHT-LEFT DISCRIMINATION AND FINGER LOCALIZATION: Development and Pathology—Arthur L. Benton, foreword by Adolph L. Sals—Hoebner-Harper, 185 p., \$7. Monograph reviews and evaluates research on the two behavioral deficits of right-left disorientation and finger agnosia.

SCIENCE IN SPACE, Chapter VI: The Sun—Leo Goldberg—Nat. Acad. of Sciences-Nat. Res. Council, 24 p., paper, \$1. (See p. 356.)

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METEOROLOGY—Committee on Atmospheric Sciences—*Nat. Acad. of Sciences-Nat. Res. Council*, 13 p., paper, single copies free upon request direct to publisher, Washington 25, D. C. Summary of training and research in the meteorological sciences in U. S. universities.

THE STORY OF CHEMISTRY—Georg Lockemann—*Philosophical Lib.*, 277 p., \$4.75. German chemist reviews the history of chemistry from antiquity to the twentieth century.

TEACHING SCIENCE THROUGH CONSERVATION—Martha E. Munzer and Paul F. Brandwein—*McGraw*, 470 p., illus., \$7.50. Practical laboratory and field study procedures for the study of conservation taught through general science, biology, chemistry and physics.

TECHNICAL ASPECTS OF DETECTION AND INSPECTION CONTROLS OF A NUCLEAR WEAPONS TEST BAN: Summary Analysis of Hearings, April, 1960—Joint Committee on Atomic Energy—*GPO*, 78 p., illus., paper, 30¢. Unanimously approved by all members of Special Subcommittee on Radiation and Subcommittee on Research and Development.

THEORY OF WING SECTIONS: Including a Summary of Airfoil Data—Ira H. Abbott and Albert E. von Doenhoff—*Dover*, rev. ed., 693 p., illus., paper, \$2.95. Corrected version of reference work first published in 1950.

THREE COPERNICAN TREATISES: The Commentariolus of Copernicus, The Letter against Werner, The Narratio Prima of Rheticius—transl. & introd. by Edward Rosen—*Dover*, 2nd rev. ed., 283 p., paper, \$1.75. With an annotated Copernicus bibliography, 1939-1958.

A TREATISE ON GYROSTATICS AND ROTATIONAL MOTION: Theory and Applications—Andrew Gray—*Dover*, 530 p., illus., paper, \$2.75. Unabridged reprint of work first published in 1918.

THE UNIVERSE OF LIGHT—Sir William Bragg—*Dover*, 283 p., illus., paper, \$1.85. Reprint of expanded, famous Royal Institute Christmas Lectures, for the general reader.

A VARIABLE ATMOSPHERIC-DENSITY MODEL FROM SATELLITE ACCELERATIONS—Luigi G. Jacchia—*Smithsonian Astrophysical Observatory, Special Report No. 39*, 15 p., paper, single copies free upon request direct to publisher, Cambridge 38, Mass.

Science News Letter, June 4, 1960

ORNITHOLOGY

Southern Birds Reported Flying Farther North

BIRDS ARE GOING farther north than they did a few years ago, according to Prof. Joseph Hickey of the University of Wisconsin wildlife management department.

Prof. Hickey said a northward trend in the ranges of birds has been noted in the United States. A number of formerly southern species now pushing into northern states.

He said a similar northward trend has been reported in Europe, and bird species from the southern parts of Europe have even been invading Scandinavia, Greenland and Iceland.

In the United States the blue wing warbler, tufted titmouse, cardinal, mockingbird and the turkey vulture are among the species moving north, Prof. Hickey said.

Science News Letter, June 4, 1960

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AN INDUSTRIAL furnace has been developed that produces "exceptionally pure" ingots of space-age materials by bombarding these hard-to-melt materials with a high-powered electron beam.

It tackles with equal vigor the melting, alloying, and refining of such hard-to-handle materials as tantalum, molybdenum, columbium, tungsten, thorium, cobalt, nickel and hafnium. Some of these materials are so active chemically that it is difficult to obtain them in a pure state. Others have extraordinarily high heat resistance and stubbornly resist melting.

The furnace will produce ingots of up to 50 pounds for tantalum, and of proportionate weights for the other materials. The biggest ingot the furnace will make measures four inches in diameter and 14 inches long.

Developed by the NRC Equipment Corporation, subsidiary of the National Research Corporation, Newton, Mass., the new furnace works in principle like a TV picture tube. A high-powered electron gun blasts a target melt area. The electron beam is focused by a magnetic focusing coil. Unlike the TV tube, the electron beam bombards a single spot instead of sweeping the melt area. But just as the TV screen has a high voltage applied, so a 20,000-volt attracting force is applied to the stock to be melted. The electron beam attacks this stock with a power of 60,000 watts.

Many engineering problems had to be solved in the development of this workhorse furnace. The high voltages used could cause bad electrical flashes inside that could wreck the electron gun. Also, high voltages

on the stock to be melted could cause X-rays to be produced during a melt. This would necessitate protective shielding around the whole furnace if such was to be a standard operating condition. Further, sudden gases belched from the melting metal could attack and harm the electron gun.

But the new vacuum furnace is said to overcome these problems to such an extent that it can be operated by skilled labor.

Science News Letter, June 4, 1960

CONSERVATION

Tree's Value Doubles Between 60 and 70 Years

THE NUMBER of board feet in a Wisconsin hardwood tree nearly doubles between the ages of 60 and 70 years, statistics compiled by the Wisconsin Conservation Department show. The department said that the average hardwood tree has reached a 12-inch diameter in 60 years, and would then produce about 57 board feet of lumber. But at the end of another 10 years, the same tree would produce 110 board feet. When it reaches the age of 100 it will yield nearly 300 board feet. In addition, the lumber from the older trees will bring a premium price because of its higher quality, the department said.

Science News Letter, June 4, 1960

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Science News Letter, June 4, 1960

MEDICINE

Concussion May Result From Changed Brain Fluid

WHAT HAPPENS to the brain when a person is stunned has been determined by two researchers at the University of California Medical Center, Los Angeles.

Dr. Benedict Cassen and Richard Neff of the Laboratory of Nuclear Medicine have explored this type of concussion, which occurs frequently with no discernible evidence of brain tissue damage.

They have obtained evidence that such a slight concussion may occur as a result of temporary changes in the fluid that bathes the brain.

These changes may take place when the permeability of the protective tissue barrier surrounding the brain is altered. Thus substances in the blood plasma, which are of a different composition than the brain fluid, may diffuse into the brain fluid.

Proper functioning of the brain depends on close control of the brain environment, the investigators pointed out. Thus changes in the brain fluid would likely alter brain function.

Radioactive phosphate ions were injected into the bloodstreams of mice shortly after they had received not too severe concussions. It was found that the radioactive phosphate increased significantly in the brain fluid and returned to normal as the concussion cleared up.

These results indicated that the brain barrier appeared to be altered to admit more phosphate. Thus the brain fluid's composition was temporarily changed.

Science News Letter, June 4, 1960

MEDICINE

Scarce Blood Fraction Provided Free to Doctors

A SCARCE BLOOD fraction, vaccinia immune globulin (VIG), is being distributed free to doctors by the American National Red Cross to offset complications sometimes arising from smallpox vaccination. The most common infections occur when children with eczema are vaccinated or when eyes are accidentally infected. A prompt use of VIG will prevent loss of vision. The fraction is obtained from the blood of persons recently vaccinated against smallpox.

Science News Letter, June 4, 1960

Less Harmful Effect From Low Radiation Doses

NEW EVIDENCE that low radiation doses may have less harmful genetic effects than previously estimated is presented in a set of summary reports issued by the National Academy of Sciences-National Research Council.

Six committees on the Biological Effects of Atomic Radiation, keeping tab on the mass of scientific information that has been accumulating since its last report in 1956, have released these additional statements, in brief:

1. During the first 30 years of life the average person can tolerate not more than 10 roentgens of man-made radiation without endangering the health of his unborn offspring and any dose should be as far below this level as is feasible.

2. Experimental evidence shows that radiation-induced tumors do not begin to develop immediately after the radiation has been absorbed.

3. No new evidence has appeared to show that nuclear tests have affected the weather.

4. The significant long-range effects of the presence of radioactive isotopes in foods remain to be determined.

5. The disposal of radioactive wastes has not resulted in any significant hazard to the public, its environment or its natural resources.

6. There is no need to restrict the nuclear energy program if precautions are continued in radioactive-waste control so that the public health and safety are protected.

7. Present indications are that limited quantities of radioactive materials can safely be released in the oceans.

Science News Letter, June 4, 1960

Do You Know

The lady beetle feeds on aphids, scales and other soft-bodied, plant-feeding insects.

The planet Pluto is about 3,666,000,000 miles from the sun.

In the U.S., insects claim an annual toll of \$4,000,000,000 in crop losses.

The National Bureau of Standards now has plans for a liquid hydrogen refrigerator which will maintain temperatures in a bubble chamber as low as 214 degrees below zero Fahrenheit.

Questions

ASTRONOMY—What happened, according to a new theory, when centrifugal force became equal to the attraction of gravity at the solar equator? p. 356.

PHYSICS—Who were the four winners of the Atoms for Peace Awards? p. 355.

SEISMOLOGY—How do tidal waves originate? p. 357.

Photographs: Cover, Bendix Aviation Corporation; p. 355, Perkin-Elmer Corp.; p. 357, Exide Industrial Division; The Electric Storage Battery Co.; p. 359, American College of Radiology; p. 362, Fremont Davis; p. 368, Magna Wonder Knife, Inc.

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New Machines and Gadgets

For sources of more information on new things described, send a self-addressed stamped envelope to SCIENCE NEWS LETTER, 1719 N St., N.W., Washington 6, D. C., and ask for Gadget Bulletin 1042. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

PLASTIC ANCHORS, available in six-, 10- and 15-pound weights, will not rust or corrode. Styled for modern boats, the anchors come in several colors and are easy to clean. Lead cores give them their weight.

Science News Letter, June 4, 1960

MULTI-GAUGE BARREL LINERS permit hunters to change their shotguns from one gauge to another. The aluminum tubes are simply inserted into the shotgun barrel. A small screwdriver is the only tool needed. The liners are sold in gauges for 12, 20, 28 and 410 gauge shotgun barrels.

Science News Letter, June 4, 1960

BLACKTOP PAINT colors asphalt drives, patios, parking lots or tennis courts. The aluminized pigment is said to reflect the sun's rays and keep painted surfaces cooler. The coating, applied with a long-handled roof coating brush, prevents erosion or water absorption, and resists gasoline and oil damage. It comes in several colors.

Science News Letter, June 4, 1960

CARVING KNIFE, shown in the photograph, features an adjustable guide or "slicing control" attached parallel to the stainless steel, serrated edge blade. The guide may be set for thicknesses from one-sixteenth to one-half inch. The knife is sold in two



models, one with plastic handle and the other with a handle of sterling silver inlay.

Science News Letter, June 4, 1960

DISPOSABLE GLASS CLOTH cleans windows, mirrors, and other glass objects without liquid or wax cleanser. The four-ply fiber polishing cloth is silicone treated to aid in removing dirt and fingermarks.

When dirty, the outer sheet may be discarded and the remaining three used. Twelve cloths are included in each package.

Science News Letter, June 4, 1960

FALLOUT SLIDE RULE is a circular rule designed for Civil Defense workers. The plastic slide rule helps determine when rescuers can enter a contaminated area, how long rescuers can remain and when the general public can safely return to the area.

Science News Letter, June 4, 1960

TURBINE GENERATOR KIT, for young students, demonstrates how water power is used to produce electricity. Water from a faucet turns a water wheel, which moves a magnet next to a coil of wire to generate six- to 12-volt alternating current. The current rings a bell, included in the kit.

Science News Letter, June 4, 1960

CHAIN FIRE ESCAPE can be stored in a compact container fastened on an interior wall beneath a window. If the ladder is needed, two pins are removed and the container swung out over the window sill, where it forms a small platform with hand rails. The chain ladder drops from the container and, for steadiness, may be hooked into a brace in the ground. The unit is made of lightweight aluminum.

Science News Letter, June 4, 1960



Nature Ramblings



By HORACE LOFTIN

EVERY HUNTER has dreamed of a massive pair of antlers perched above his fireplace, a trophy of the largest and finest buck ever taken by anyone in the neighborhood. Presumably our caveman ancestors shared this hunter's dream. If our caveman great-uncle ever got his wish, he would need an outsized fireplace. Antlers in those days ran up to 11 feet from tip to tip!

The bogs of Ireland have been a storage place for such gigantic antlers, fallen from the magnificent Irish elk of many thousands of years ago. From time to time, these antlers turn up, furnishing inspiration for the yarn-spinners at the local pub. "Ah! What foin beasts we had in the old days, now!"

The Irish elk was, indeed, a fine animal, probably the greatest in size of any of the deer family. It has been suggested that his very bulk and the huge antlers he bore led to his extinction. Why, one wonders, were such antlers evolved? What possible adap-

A Set of Antlers



tive advantages could 11-foot antlers provide?

The best answer is that, probably, the oversized antlers provided no particular advantage to the animal. They were the result of, or function of, his otherwise enormous mass.

It has been shown with modern deer that antler growth is directly proportional to the overall size of the animal, and that antlers grow at a faster rate than the body. If a modern-day elk were to grow to the

size of the Irish elk, its antlers would then be as supersized as were those of his extinct relative.

Among the deer with the smallest antlers is the little roe deer of Europe who has small antlers with but three points. The rabbit-sized pudua deer of Chile bears only a tiny spike for an antler. Some antler-less members of the deer family are thought to represent "pygmy" races, derived from stock that was larger and well antlered.

Antlers are quite distinct structures from the horns of cattle and similar animals. The cow's horn is covered with a hard material similar in nature to our fingernails. Further, the true horn is never shed. Antlers, on the other hand, are made only of bone. They are covered with a skin of "velvet" during their growth, but this is soon lost. Once a year, the deer sheds his antlers, leaving nothing but a hard "burr" on the skull. This is replaced the following season by a new and larger set of antlers—larger in proportion to the growth of the animal.

Science News Letter, June 4, 1960